NOVA SCOTIA
Environment and Labour

# Disinfection of Water Wells by Chlorination

## Disinfection of Water Wells by Chlorination

Chlorination, or "shock chlorination", is the process of flushing your well and water system with a chlorine solution to kill bacteria and other microorganisms. Disinfection by chlorination is usually recommended if a water sample from the well has tested positive for bacteria. It is an effective method to eliminate a "one-time" case of bacterial contamination; however, if there is an on-going problem related to faulty well construction or contaminated groundwater, disinfection is only a temporary fix and the problem should be investigated and corrected at the source.

## How do I disinfect my well?

It may take up to 24 hours to complete the disinfection process. Before you begin, make sure you store enough water to meet your household needs during this period. If you have a water softener or other treatment units, check with your treatment dealer whether disinfection could adversely affect the unit or not.

**Step 1.** Mix the amount of liquid bleach shown in Table 1-1 for your well in 10 to 20 litres (2 to 5 gallons) of water. Use common, unscented household bleach that does not contain detergent or other additives such as fabric-guard. Chlorine can be dangerous if not used properly. Always follow the directions on the label for safe storage, handling and use.

**Step 2.** Remove the well cap and pour the mixed chlorine solution into the well. If the well is buried with the old type of well seal top, either expose the top of the well, remove the well seal and pour the solution directly into the well, or pour the solution through a clean funnel into the air vent or siphon through the vent (flush the air line with clean water after chlorination).

**Step 3.** Open one faucet in the system and let the water run until the chlorine odour is detected. Turn this faucet off. Repeat at each faucet in the system in turn, one at a time, until all faucets have been completed (include inside and outside faucets, cold and hot water, dishwashers, toilets, baths, showers, sinks, etc.).

**Step 4.** If possible, connect a garden hose to a nearby tap and place the other end in the well. Turn on the tap and allow the water to circulate for about one hour to ensure that the chlorine is thoroughly mixed in the well. During this process, add additional chlorine solution if the chlorine odour is not strong. Note that although recirculation is desirable if possible, it may not be appropriate in wells with screens, gravel packs, heavy iron buildup, soft or caving zones, and other less common conditions. If you have any concerns, contact your local Department of Environment and Labour Office or a certified contractor for information.

**Step 5.** Seal the top of the well and let the system sit idle for about 12 hours, preferably overnight. Do not leave chlorine for more than 24 hours as it may affect some pump parts.

**Step 6.** After this time, flush the system by discharging the chlorinated water through an outside tap until the chlorine odour has completely disappeared. Pump at a low rate, in the order of 10 litres per minute (2 gallons per minute) or less. This procedure may take several hours, or longer. IF you have a low yield well, you may have to allow the well to recover between pumping periods. During the flushing process, do not discharge the chlorinated water to a natural water body (such as streams or lakes, etc.) or to areas where it can harm desired vegetation (e.g., vegetable gardens, landscaped areas, etc.). Do not discharge this water into the on-site sewage disposal system.

## Sampling after Disinfection

After disinfection, sample the water for total coliform and E. coli bacteria to confirm that the water is safe to drink. Wait about 5 days after disinfection before sampling. While waiting for the results, any water for human consumption should be boiled (rolling boil) for at least 1 minute, or use an alternative source.

IF the sample result indicates that both coliform bacteria and E. coli are absent, confirm that disinfection has been effective by 2 additional samples, one in the next 2 to 4 weeks, another after 3 to 4 months. To check the safety of your water over the long term, continue to monitor bacterial quality at least twice a year, or more often if you suspect any changes in your water quality.

IF the sample result indicates either coliform bacteria and/or E. coli present, it is recommended that the well owner seek advice from the Department of Environment and Labour or a certified professional. In the meantime, continue to use boiled water or an alternative source for human consumption activities.

## Final Notes

You may experience some temporary inconveniences as a result of the disinfection process such as dirty or discoloured water, staining, or sedimentation problems. However, the water should clear with time. In some cases, a few days may be necessary. Do not use the water for aquariums or pets during this time. Check with your physician about other uses of the water, such as bathing, if you have allergies or other medical concerns.

Please note that under some conditions, such as biofilm buildup in a well, more than one disinfection may be required.

If you have any questions about disinfecting your well, or wish to have a certified person do the work for you, please contact your local Department of the Environment and Labour Office for information, or check the certified contractor list at:
www.gov.ns.ca/enla/water

**TABLE 1-1**

| Depth of water in well | | Amount of unscented household bleach[1] | |
|---|---|---|---|
| | | Drilled Well | Dug Well |
| metres | feet | Casing Diameter 15 cm (6 inches)[2] | Casing Diameter 92 cm (36 inches)[2] |
| 1 | 3 | 40 mL | 1.5 L |
| 3 | 10 | 120 mL | 4.5 L |
| 5 | 15 | 200 mL | 7.5 L |
| 10 | 30 | 400 mL | 15.0 L |
| 30 | 100 | 1.2 L | |
| 50 | 150 | 2.0 L | |
| 100 | 300 | 4.0 L | |

**Notes:**

1 Assumes liquid bleach with approximately 5.2% hypochlorite. This will produce about 100 mg/L of chlorine solution when mixed with the water in the well.

2 For wells with other casing diameters, contact your local Department of Environment and Labour Office

**Example Calculation for a Drilled Well:**

**Measurements:**

- Well diameter = 150 mm (6 in)
- Well depth = 60 m (200 ft)
- Depth to water from surface = 10 m (30 ft)

**Calculations:**

- Depth of water in well = 60 - 10 = 50 m or depth of water in well = 200 - 30 = 170 ft
- From Table 1-1, required volume of bleach to get 100 mg/L solution is about 2 litres